

REMARKS

We have replaced prior claim 5 with a newly amended claim 5. The other claims remain unchanged. After the amendment, claims 5-12 remain pending in the application.

We have amended the specification by describing the element 10a which was objected to by the examiner as missing in the description of the invention. Therefore, this objection is removed.

In response to the rejection under 35 USC 112, second paragraph of claims 5-12, we have replaced the prior claim 5 with the newly amended claim 5 in which the phrases which the examiner identified as being indefinite have been removed. Therefore, we believe the rejection under the second paragraph should be removed.

In response to the rejection under 35 USC 102(b) by Vidusek (U.S.P. 5,176,325), and Weaver et al (U.S.P. 5,603,453, hereinafter Weaver), we respond as follows.

Before we begin to discuss the comparison of the invention to the prior art, please note the following with regard to applicant's invention.

1. It involves exhaust gases of an internal combustion engine.
2. The exhaust gases are delivered to a reducing catalytic converter.
3. The reducing agent is transported to the supply tube by means of compressed air, by being acted upon with compressed air outside the exhaust pipe.

Now we discuss the two patents which the examiner has applied in his rejection.

Weaver describes a mixing chamber arrangement 36 without outlet openings for a

fixed exhaust gas device of a coal-fired or refuse combustion system (see column 1, lines 5 through 18 and column 3, lines). The mixing chamber is disposed inside the exhaust gas device 10 through which the exhaust gas flows, and a fluid mixture (“slurry”) is delivered to the mixing chamber via a transport line 42 (see Fig. 1, column 4, lines 35 through 40). A second line 37 supplies air to the mixing chamber (column 3, lines 46 through 55). The slurry is mixed with the delivered air, released from the mixing chamber through the outlet openings, and supplied directly to the exhaust gas device.

Vidusek describes a mixing chamber arrangement for coal-fired combustion systems analogous to Weaver et al (see abstract).

In contrast, this application claims a device for acting on an exhaust gas from an internal combustion engine, flowing in an exhaust pipe, with a reducing agent, wherein in the exhaust pipe, the exhaust gases are delivered to a reducing catalytic converter. A supply tube is provided, through which the reducing agent is transported via compressed air, and is acted upon by compressed air outside the exhaust pipe. Thus, compared to the prior art, these are the following distinctions:

1. Reducing agent;
2. Treatment of the exhaust gases of an internal combustion engine;
3. Delivery of the exhaust gas along with the reducing agent to a reducing catalytic converter;

4. No mixing chamber inside the exhaust pipe; instead, delivery of air by the exhaust pipe, in order to transport the reducing agent through the delivery tube; and

5. Throttle in the supply tube, not in a mixing chamber;

The subject of this application is therefore novel.

Nor can any indications be found in the prior art of providing a throttle inside a supply tube, which throttle, for treating automotive exhaust gases, introduces reducing agent with the support of compressed air into the exhaust gas system, and the reducing agent is subjected to compressed air outside the exhaust pipe. As a result, even in heat-sensitive reducing agents such as a urea-water solution, it becomes possible to compensate for an uneven formation of a wall film and to introduce the solution uniformly in the form of an aerosol into the exhaust gas stream. Conversely, in Weaver, a mixing chamber for delivering air is disposed inside a gas stream. This arrangement, which the examiner erroneously interprets as part of a supply tube, is not suited for introducing in particular a mixture of a urea-mixture solution and air into the exhaust gas system of an internal combustion engine. The urea would break down immediately if it stayed too long in the region of hot exhaust gas temperatures without simultaneously coming into contact with the exhaust gas and still being able to develop its reducing action there. Yet precisely this would be the case if one wanted to use the arrangement of Weaver for this purpose, since in that case the urea would first be mixed with a second fluid (air) in the mixing chamber disposed in the hot exhaust gas (and specifically

would not be mixed until then, and not already outside the exhaust pipe as in the subject of our application), before reaching the exhaust gas system. There, because it had already broken down, it can no longer contribute to the removal of nitrogen from the exhaust gas. Moreover, in the mixing chamber, pressures of over 5 bar prevail (see Table 1 in Weaver). The object there is instead to mix the introduced slurry as intensively as possible with a gas; a wall film here would be more a hindrance than a help. Nor is it necessary for transporting the fluid, since the mixing chamber is already located in the gas stream. And the fluid merely needs to escape through holes in the mixing chamber in order to be back in the gas stream again. Weaver, therefore, (just like Vidusek), by proposing the disposition of a mixing chamber inside the exhaust pipe, teaches away from the subject of the invention. The subject of this application is thus novel.

Especially important here is the fact that a supply tube in the instant application is a supply tube WITHOUT a mixing chamber disposed inside the exhaust pipe, because a mixing chamber inside the exhaust pipe makes no sense whatever in an arrangement in which the liquid medium is already subjected to compressed air outside the arrangement. Or, looking at it from the other way, the examiner incorrectly uses hindsight to interpret the mixing chambers of Vidusek and Weaver as part of a delivery tube. In those systems, however, there is no wall film problem whatsoever, because the mixing chamber is located inside the exhaust pipe, and it, therefore, does not matter whether a wall film has formed (which is advantageous for transportation over long distances), or whether the wall film has meanwhile partly torn

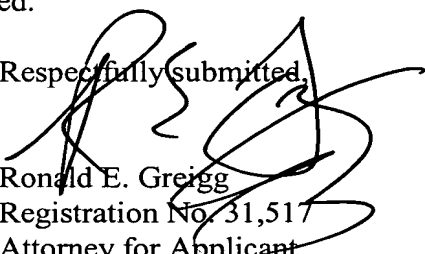
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apart, or how this tearing apart can be compensated for again in order to assure a uniform inflow of aerosol into the exhaust gas system. Conversely, a supply tube as disclosed in this application, as explained above, already delivers the reducing agent with support of compressed air from outside the exhaust pipe.

In conclusion, the invention as claimed in the amended claim 5 and its dependent claims 6-12, clearly defines over either Vidusek or Weaver for the reasons given above.

We believe that we have satisfied the examiner's objection to the drawings by amending the specification by removing the rejection under 35 USC 112, second paragraph and by arguing the rejections under 35 USC 102(b) by this amendment. Consequently, the allowance of claims 5-12 is earnestly requested.

Respectfully submitted,


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